

UTILITY PATENT APPLICATION TRANSMITTAL UNDER 37 C.F.R. §1.53(b)

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 Box PATENT APPLICATION
 Washington D.C. 20231

Case Docket No.: P-133

Sir:
 Transmitted herewith for filing is the patent application of
 INVENTOR OR APPLICATION IDENTIFIER: Hyun Ki CHOI, Hee Jung LEE
 FOR: ANTENNA BUILT-IN TYPE MOBILE PHONE

Enclosed are:

- | | |
|---|--|
| 1. <input checked="" type="checkbox"/> 10 pages of specification, claims, abstract | 7. <input checked="" type="checkbox"/> Assignment Papers for LG Electronics Inc. (cover sheet, assignment & assignment fee). |
| 2. <input checked="" type="checkbox"/> 3 sheets of FORMAL drawing. | 8. <input type="checkbox"/> Certified copy of <u>Korean Patent Application No.</u> |
| 3. <input checked="" type="checkbox"/> 2 pages of newly executed Declaration & Power of Attorney (original). | |
| 4. <input checked="" type="checkbox"/> Priority Claimed to Korean Appln. No.42406/1999 filed on October 1, 1999, whose entire disclosure is incorporated herein by reference. | 9. <input checked="" type="checkbox"/> Two (2) return postcards. |
| 5. <input type="checkbox"/> Small Entity Statement. | <input checked="" type="checkbox"/> Stamp & Return with Courier. |
| 6. <input type="checkbox"/> Information Disclosure Statement, Form PTO-1449 and reference. | <input checked="" type="checkbox"/> Prepaid Postcard-Stamped Filing Date & Returned with Unofficial Serial Number. |
| 10. <input checked="" type="checkbox"/> Authorization under 37 C.F.R. §1.136(a)(3). | |
| 11. <input type="checkbox"/> Other: | |

CLAIMS AS FILED

For	No. Filed		No. Extra	Rate	Fee
Total Claims	20	- 20	0	X \$18.00	\$0.00
Indep. Claims	3	- 3	0	X \$78.00	\$0.00
Multiple Dependent Claims (If applicable)				X \$260.00	\$0.00
				BASIC FEE	\$690.00
				TOTAL FILING FEE	\$690.00

- ☐ This is a Continuation-in-part (CIP) of prior application No: _____ filed _____. Incorporation By Reference-The entire disclosure of the prior application is considered as being part of the disclosure of the accompanying application and is hereby incorporated by reference therein.
- ☐ Amend the specification by inserting before the first line the sentence:
 -This application is a continuation-in-part of Application Serial No. _____ filed _____.--
- ☒ A check in the amount of \$690.00 Check # 9510 is attached.
- ☐ Please charge my Deposit Account No. 16-0607 in the amount of \$____. A duplicate copy of this sheet is enclosed.
- ☒ The Commissioner is hereby authorized to charge payment of the following fees associated with this communication or credit any overpayment to Deposit Account No. 16-0607. A duplicate copy is enclosed.
- ☒ Any additional filing fees required under 37 C.F.R. 1.16.
- ☒ The Commissioner is hereby authorized to charge payment of following fees during the pendency of this application or credit any overpayment to Deposit Account No. 16-0607. A duplicate copy of this sheet is enclosed.
- ☒ Any patent application processing fees under 37 C.F.R. 1.17.
- ☒ Any filing fees under 37 C.F.R. 1.16 for presentation of extra claims.

FLESHNER & KIM, LLP

Daniel Y.J. Kim
 Registration No. 36,186

Correspondence Address Below:
 P.O. Box 221200
 Chantilly, VA 20153-1200
 (703) 502-9440 DYK/pd
 Date: September 29, 2000

jc511 U.S. PTO
 09/29/00

ANTENNA BUILT-IN TYPE MOBILE PHONE

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to an antenna built-in type mobile phone.

2. Description of the Background Art

Figure 1 is a schematic view of a general mobile phone in accordance with a conventional art.

As shown in the drawing, the conventional mobile phone includes a Helical antenna 1 fixedly installed at the upper end portion of a main body 3 and a monopole antenna 2 installed in a certain space of the mobile phone through the Helical antenna 1. For a telecommunication, the monopole antenna is pulled out, which has a length of $\lambda/4$.

When the user tries a telecommunication, current flows to the antenna, and electromagnetic wave is radiated toward a base station. In this respect, in case of using only the Helical antenna 1, without pulling out the monopole antenna 2, the resonant frequency of the antenna is adjusted with a called party. Meanwhile, in case of pulling out the monopole antenna 2 to increase the gain of the antenna, the resonant frequency is adjusted with a calling party.

Generally, downsizing of a mobile phone has a close relation with the size and the weight of the antenna. In line with the development of telecommunication techniques and increasing users' desire, mobile phones become compact and light rapidly, and in this respect, the antenna is paid much

attention increasingly.

However, in order to build the monopole antenna in the main body of the mobile phone, a space is required in the mobile phone, which is disadvantageous in promotion of a compact and lightweight mobile phone.

5 In addition, since the antenna is fabricated through a number of processes, degrading the productivity.

Also, since the Helical antenna is installed to be outwardly protruded, it is inconvenient in that when users pull out the mobile phone, the antenna may be caught on a pocket of clothes or in a bag. In order to overcome the defects, in
10 case of shortening the antenna, the frequency gain is reduced, degrading the performance of the mobile phone.

SUMMARY OF THE INVENTION

15 Therefore, an object of the present invention is to provide an antenna built-in type mobile phone which is directed to accomplish a compact size and light weight.

Another object of the present invention is to provide an antenna built-in type mobile phone which is capable of enhance a productivity by virtue of a simple
20 fabrication process.

To achieve these and other advantages and in accordance with the purpose of the present invention, as embodied and broadly described herein, there is provided an antenna built-in type mobile phone including a mobile phone main body; and a battery detachably installed in the mobile phone main body
25 having an antenna at a predetermined position therein.

In the antenna built-in type mobile phone of the present invention, the battery includes a battery cell in a predetermined form, an antenna provided at the upper and the side portions of the battery cell, and a battery pack for holding the battery cell and the antenna.

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BRIEF DESCRIPTION OF THE DRAWINGS

The accompanying drawings, which are included to provide a further understanding of the invention and are incorporated in and constitute a part of this specification, illustrate embodiments of the invention and together with the description serve to explain the principles of the invention.

In the drawings:

Figure 1 illustrates a general mobile phone in accordance with a conventional art;

Figure 2 is a perspective view of an antenna built-in type mobile phone in accordance with the present invention;

Figure 3 is a perspective view of an antenna provided at a certain position of the upper portion of the battery of Figure 2 in accordance with the present invention;

Figure 4 is a perspective view of an antenna provided at a certain position of the side portion of the battery of Figure 2 in accordance with the present invention; and

Figures 5A and 5B illustrate forms of antenna in accordance with the present invention.

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DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Reference will now be made in detail to the preferred embodiments of the present invention, examples of which are illustrated in the accompanying drawings.

5 Figure 2 is a perspective view of an antenna built-in type mobile phone in accordance with the present invention, Figure 3 is a perspective view of an antenna provided at a certain position of the upper portion of the battery of Figure 2 in accordance with the present invention, and Figure 4 is a perspective view of an antenna provided at a certain position of the side portion of the battery of
10 Figure 2 in accordance with the present invention.

As shown in Figure 2, the antenna built-in type mobile phone of the present invention is inserted in a battery 102 detachably attached to the mobile phone, rather than being provided in a main body 100 like in the conventional art.

15 In detail, with reference to Figure 3, the antenna 10 is positioned in a predetermined area of the upper portion of the battery cell 12. A dielectric substance 14 is inserted between the antenna 10 and the battery cell 12, or there remains a space between the antenna 10 and the battery cell 12, in which air serves as a dielectric. The antenna 10 and the battery cell 12 are inserted within a battery pack (not shown).

20 As shown in Figure 4, the antenna may be positioned at the side portion of the battery cell 12. In this case, the antenna is positioned at the outer side of the battery cell 12 in consideration of a frequency characteristic.

The reason for this is that if the antenna is installed at the inner side of the battery cell 12, when the battery 102 and the main body 100 are combined, the
25 antenna 10 becomes closely adhered to the main body 100, deteriorating a

frequency characteristic.

Figures 5A and 5B illustrate forms of antenna in accordance with the present invention.

As shown in the drawing, the antenna 10 is implemented with a linear or a zigzag-shaped wire. And, the antenna 10 may be formed in a circular or an oval form as required. One terminal of the antenna 10 is electrically connected with a radio frequency (RF) processing unit of the mobile phone main body 100, while the other terminal thereof is grounded. At this time, the thickness of the wire of the antenna can be adjusted as required, for which a single or many-fold wire may be used as required.

As so far described, according to the antenna built-in type mobile phone of the present invention, since the antenna is built in the battery which is detachably attached to the mobile phone, so that the mobile phone can be more compact and lightweight.

In addition, by building the antenna in the battery, the mobile phone can be more convenient to use. And, its productivity can be more improved by removing the complicate processes to provide the antenna in the main body of the mobile phone.

As the present invention may be embodied in several forms without departing from the spirit or essential characteristics thereof, it should also be understood that the above-described embodiments are not limited by any of the details of the foregoing description, unless otherwise specified, but rather should be construed broadly within its spirit and scope as defined in the appended claims, and therefore all changes and modifications that fall within the meets and bounds of the claims, or equivalence of such meets and bounds are therefore intended to

be embraced by the appended claims.

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What is claimed is:

1. An antenna built-in type mobile phone comprising:
a mobile phone main body; and
5 a battery detachably attached to the mobile phone main body and having
an antenna at a predetermined portion therein.

2. The mobile phone according to claim 1, wherein the battery
comprising:
10 a battery cell in a predetermined form,
an antenna positioned at a predetermined portion within the battery cell,
and
a battery pack for holding the battery cell and the antenna.

3. The mobile phone according to claim 2, wherein a dielectric
15 substance or a space exists between the antenna and the battery cell.

4. The mobile phone according to claim 2, wherein the antenna is
positioned at an upper portion of the battery cell.

5. The mobile phone according to claim 2, wherein the antenna is
20 positioned at a side portion of the battery cell.

6. The mobile phone according to claim 5, wherein the side portion
25 of the battery cell is the outer side of the battery.

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7. The mobile phone according to claim 2, wherein the antenna is formed by a single or a many-fold wire.

8. The mobile phone according to claim 7, wherein the antenna is of
5 a linear, a zigzag or an oval shape.

9. An antenna built-in type mobile phone comprising:
a mobile phone main body; and
a battery detachably attached to the mobile phone main body
10 of which the battery comprising:
a battery cell;
an antenna positioned adjacent to the battery cell; and
a battery pack for holding the battery cell and the antenna therein.

10. The mobile phone according to claim 9, wherein a dielectric
15 substance or a space exists between the antenna and the battery cell.

11. The mobile phone according to claim 9, wherein the antenna is
positioned at an upper portion or at a side portion of the battery cell.
20

12. The mobile phone according to claim 11, wherein the side portion
of the battery cell is the outer side of the battery.

13. The mobile phone according to claim 9, wherein the antenna is
25 formed by a single or a many-fold wire.

14. A battery of a mobile phone comprising:

a battery cell;

an antenna electrically connected with a mobile phone main body and implemented at a predetermined position adjacent to the battery cell; and

5 a battery pack holding the battery cell and the antenna therein

15. The battery according to claim 14, wherein a dielectric substance or a space exists between the antenna and the battery cell.

10 16. The battery according to claim 14, wherein the antenna is positioned at the upper portion of the battery cell.

17. The battery according to claim 14, wherein the antenna is positioned at the side portion of the battery cell.

15 18. The battery according to claim 17, wherein the side surface of the battery cell is the outer side surface of the battery.

19. The battery according to claim 14, wherein the antenna is formed
20 by a single or a many-fold wire.

20. The battery according to claim 14, wherein the antenna is of a linear or a zigzag shape.

ABSTRACT OF THE DISCLOSURE

An antenna built-in type mobile phone includes a mobile phone main body; and a battery detachably installed in the mobile phone main body and having an antenna at a predetermined position thereof. The battery includes a battery cell in a predetermined form, an antenna provided at the upper and the side portions of the battery cell, and a battery pack for holding the battery cell and the antenna.

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FIG. 1
BACKGROUND ART

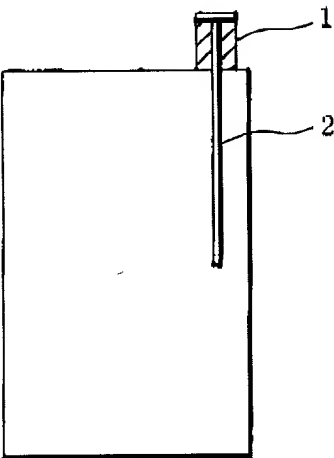
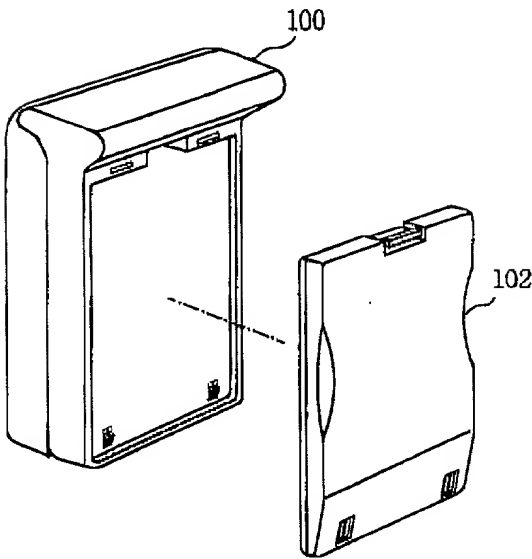


FIG. 2



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FIG. 3

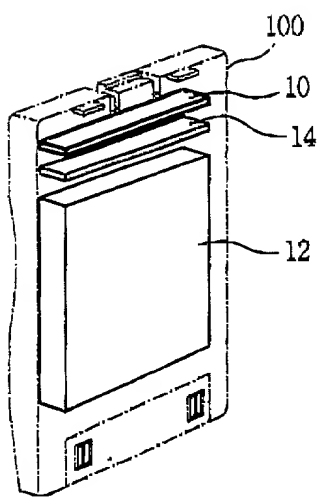
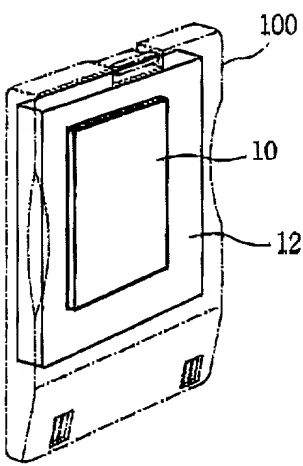


FIG. 4



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FIG. 5A

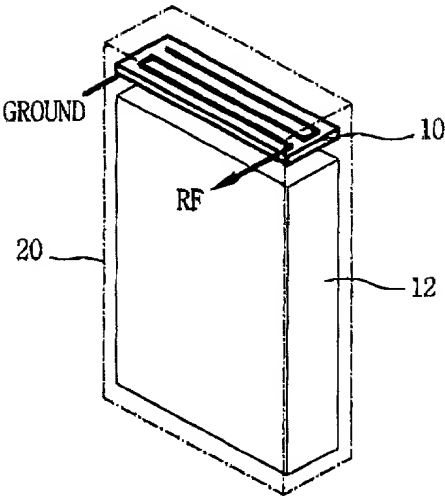
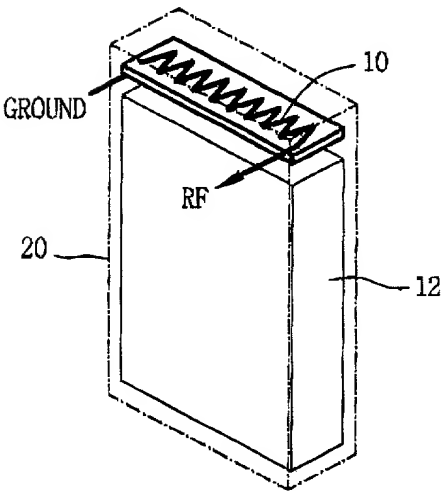


FIG. 5B



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Docket No.:

DECLARATION AND POWER OF ATTORNEY

As a below named inventor, I hereby declare that:

My residence, post office and citizenship are as stated below next to my name,

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter claimed and for which a patent is sought on the invention entitled ANTENNA BUILT-IN TYPE MOBILE PHONE, the specification of which

☒ is attached hereto ☐ was filed on _____ as Application Serial No. _____ and was amended on _____ (if applicable)

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is known to me to be material to patentability in accordance with Title 37, Code of Federal Regulations, Section 1.56(a).

I hereby claim foreign priority benefits under 35 U.S.C. 119(a)-(d) or 365(b) of any foreign application(s) for patent or inventor's certificate, or 365(a) of any PCT international application which designated at least one country other than the United States of America, listed below and have also identified below, by checking the box, any foreign application for patent or inventor's certificate, or of any PCT international application having a filing date before that of the application on which priority is claimed.

Prior Foreign Application(s):**Foreign Filing Date**
Month/Day/Year**Number****Country**

42406/1999

Republic of Korea

October 1, 1999

I hereby claim the benefit under 35 U.S.C. 119(e) of any United States provisional application(s) listed below:

Application Number(s)**Filing Date(Month/Day/Year)**

I hereby claim the benefit under 35 U.S.C. 120 of any United States application(s), or 365(c) of any PCT international application Designating the United States of America, listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States or PCT international application in the manner provided by the first paragraph of 35 U.S.C. 112, I acknowledge the duty to disclose information which is material to patentability as defined in 37 CFR 1.56 which became available between the filing date of the prior application and the national or PCT international filing date of this application.


**Prior U. S. Application
or PCT Patent Number****Filing Date(Month/Day/Year)****Parent Patent Number(if application)**

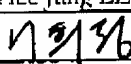
I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon

I hereby appoint the following attorney(s) and/or agent(s): Daniel Y.J. Kim, Registration No. 36,186 and Mark L. Fleshner, Registration No. 34,596; Carl R. Wesolowski, Registration No. 40,372, John C. Eisenhart, Registration No. 38,128, and Rene A Vazquez, Registration No. 38,647; Michael J. Cornelison, Registration No. 40,395; and Stuart I. Smith, Registration No. 42,159, all of

FLESHNER & KIM
P.O. Box 221200
Chantilly, Virginia 20153-1200

with full power of substitution and revocation, to prosecute this application and to transact all business in the Patent and Trademark Office connected therewith, and all further correspondence should be addressed to them

Full name of solo or first inventor: Hyun Ki CHOI
Inventor's signature:  Date: 09/26/2000
Residence: Bucheon, Korea
Citizenship: Republic of Korea
Post Office Address: Dongjin Apt 6-301, 334-1, Wonjong 1-Dong, Woojeong-Ku,
Bucheon, Kyungki-Do, Korea

Full name of joint inventor(s): Hee Jung LEE
Inventor's signature:  Date: 09/26/2000
Residence: Bucheon, Korea
Citizenship: Republic of Korea
Post Office Address: Sarangmaeul 1606-1602, Sang-Dong, Wonmi-Ku,
Bucheon, Kyungki-Do, Korea

Full name of joint inventor(s):
Inventor's signature: Date:
Residence:
Citizenship:
Post Office Address: